

REMARKS

Claims 1-3, 5-10 and 12-21 are currently pending, of which claims 3, 10 and 13-21 have previously been withdrawn from consideration. Claims 1, 5, 6, 8 and 12 have been amended herein. Claims 3 and 11 have been canceled, their subject matter being incorporated into claims 1 and 8, respectively. Pursuant to the Examiner's request, Applicants have submitted a new drawing (Figure 9), and have amended Figure 3 to indicate which cross-section newly submitted Figure 9 represents. No new matter has been added by way of the above amendments to the Claims, Specification and Drawings. Applicants respectfully request reconsideration of the above-identified application in light of the above amendments and the following remarks.

The Drawings have been amended to include new Figure 9, as requested by the Examiner. Figure 3 has been amended 3 to indicate which cross-section newly submitted Figure 9 represents.

The Specification has been amended to reference newly added Figure 9. Specifically, the Brief Description of the Drawings section has been amended.

Claims 1 and 8 have been amended to recite an electromagnetic actuator, "wherein [a] cylinder includes a first cylindrical member made of nonmagnetic material, the first cylindrical member at least partially surrounding [a] stationary core and [a] movable core, and a second cylindrical member made of magnetic material, wherein the second cylindrical member is cup-shaped." Support for these amendments is found throughout the Specification and Drawings, as filed, for example in the Specification at page 11, last paragraph and in Figure 3.

Claims 5 and 12 have been amended to recite that "a connecting portion [is] located between the small diameter portion and the large diameter portion, which connects the large diameter portion and the small diameter portion, and wherein the connecting portion forms

a step.” Support for these amendments is found throughout the Specification and Drawings, as filed, for example in the Specification at page 11, last paragraph and in Figures 3 and 4.

Claim 6 has been amended to recite that “the second cylindrical member is cup-shaped and has one of a bottom portion and a step that serves as a positioning portion for determining the axial position of the first cylindrical member with respect to the second cylindrical member,” and that “when the second cylindrical member is fitted to the first cylindrical member, a part of the small diameter portion of the first cylindrical member contacts one of the bottom portion and the step of the second cylindrical member to determine the axial position of the first cylindrical member with respect to the second cylindrical member....”

Support for this amendment is found throughout the Specification and Drawings, as filed, for example in the Specification at page 11, last paragraph through page 12, second paragraph, in Figures 3 and 4, and in Claim 6, as filed.

Objections to the Drawings

The drawings have been objected to for allegedly not showing the claimed stationary core being (at least partially) surrounded by the first cylindrical member. As set forth above, Figure 9 has been added to illustrate this claimed subject matter. Additionally, Figure 3 has been amended to indicate the position at which the cross-section of Figure 9 is taken. Applicants believe that new Figure 9 and amended Figure 3 obviate the above-described objection to the drawings.

Claim Rejections under 35 U.S.C. § 112

Claims 1-2, 3-9 and 11-12 have been rejected under 35 U.S.C. § 112, second paragraph as allegedly being indefinite. Specifically, the Examiner has suggested that claims 1 and 8 should recite that the first cylinder “at least partially” surrounds the stationary core. Regarding claim 5, the Examiner has requested that Applicants clarify the structure of the first cylinder portion. Regarding claim 6, the Examiner has requested a clarification of the specific structure and arrangement of the “positioning member.”

Applicants respectfully submit that the above amendments to these claims address the above-described rejections. As amended, Applicants submit that these claims satisfy the requirements of 35 U.S.C. § 112, second paragraph for definiteness. Withdrawal of the rejection applied to claims 1-3, 5-9 and 12 under 35 U.S.C. § 112, second paragraph is respectfully requested. As set forth above, claims 4 and 11 have been canceled, thus obviating the rejection of these claims.

As amended, Applicants’ invention relates to, *inter alia*, a control valve using an electromagnetic actuator, in which a first cylindrical member at least partially surrounds a stationary core and a movable core, the actuator also having a cup-shaped second cylindrical member. A part of the first cylindrical member in the vicinity of the movable core is thinner than a remainder of the first cylindrical member, thereby creating a small diameter portion. The small diameter portion is fitted to the second cylindrical member.

Accordingly, the claimed device can generate a desired electromagnetic force without an increased size, and can suppress hysteresis generated in operation. In addition, since the second cylindrical member is cup-shaped, the second cylindrical member has a greater

strength and is stably fitted to the first cylindrical member without deformation. See page 18, lines 15-20 of the specification.

Claim Rejections under 35 U.S.C. § 102

Claims 1, 5, 7 and 8 have been rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Curnow (U.S. Pat. No. 5, 261,637) ("Curnow"). Applicants respectfully traverse this rejection.

Curnow cannot anticipate amended independent claims 1 or 8, or any claim depending therefrom, because it does not teach every element of that claim. See MPEP §2131, p. 2100-69 (quoting Verdegaal Bros. v. Union Oil Co. of California , 814 F.2d 628, 631 (Fed. Cir. 1987) ("[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference")).

Amended independent Claims 1 and 8 recite, an electromagnetic actuator, wherein a cylinder includes a first cylindrical member made of nonmagnetic material, the first cylindrical member "at least partially surrounding" a stationary core and a movable core, and a second cylindrical member made of magnetic material, "wherein the second cylindrical member is cup-shaped."

Curnow describes an electromagnetic actuator having a cylinder assembly, a stationary core piece, a movable core, and a coil. The Office Action states at page 5, paragraph 4, that Curnow does not disclose "the cylinder assembly being cup-shaped" or "the second cylinder member forming the cup shaped portion connected and positioned with the first cylindrical portion via a stepped region." Applicants agree that this subject matter, a portion of which is now recited in independent claims 1 and 8, is not taught or suggested by Curnow. More

specifically, Curnow does not teach or suggest an electromagnetic actuator, wherein a cylinder includes a first cylindrical member made of nonmagnetic material, the first cylindrical member “at least partially surrounding” a stationary core and a movable core, and a second cylindrical member made of magnetic material, “wherein the second cylindrical member is cup-shaped,” as recited in amended independent Claims 1 and 8.

Applicants respectfully submit that amended independent claims 1 and 8, and all claims depending therefrom, define patentable subject matter over Curnow. Withdrawal of the rejection applied to claims 1, 5, 7 and 8 under 35 U.S.C. § 102(b) as allegedly being anticipated by Curnow, is respectfully requested.

Claim Rejections under 35 U.S.C. § 103

Claims 2, 4, 6, 9 and 11-12 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Curnow in view of Tackett et al. (U.S. Pat. No. 6,065,734) (“Tackett”).

Applicants respectfully traverse this rejection.

“To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art.” MPEP §2143.03 (citing In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)).

The deficiencies of Curnow have been set forth above. Tackett does not remedy these deficiencies. Tackett describes a control valve for a hydraulic brake system. The Office Action argues, “Tackett et al. disclose an electromagnetic actuator [18] having a cylinder member [122] formed of a non-magnetic portion [126] having a stepped region [figure 3] connected to a cup-shaped portion [124].” See Office Action at page 5, paragraph 5.

However, Tackett describes element 122 as a “flux tube or sleeve” (Tackett, col. 3, line 58). That is, this is a magnetic or magnetically conductive portion, not non-magnetic as alleged by the Office Action.

Moreover, there is no motivation to combine the teachings of Tackett with those of Curnow. The Office Action states that “it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the cylinder design of Tackett et al. with the cylinder of Curnow in order to reduce the overall diameter of the actuator assembly.

However, the shape of the core tube 32 of Curnow, has a continuous wall that completely surrounds the armature 114. There are no walls with which the inner sleeve 44 can be attached to the core tube 32, as proposed by the Examiner. In order to join a cup-shaped portion to the core tube 32 of Curnow via a stepped region, as proposed by the Examiner, one would necessarily remove the entire lower portion of the core tube 32, and along with it, the end 106 and the recesses 107 of the core tube 32. Such an alteration of Curnow would result in excess friction between the armature 114 and the newly joined cup-shaped portion of Tackett. For the reasons explained in Applicants’ Specification at page 2, paragraph 3. Thus, the thickness would not be reduced without detrimentally altering other aspects of the Curnow device. For the above reasons, Applicants respectfully submit that a *prima facie* case of obviousness has not been established.

In light of the foregoing, Applicants respectfully submit that amended independent claims 1 and 8, and all claims depending therefrom, define patentable subject matter over Curnow and Tackett, considered alone or in combination. Withdrawal of the rejection applied to claims 2, 6, 9 and 12 under 35 U.S.C. § 103(a) as allegedly being unpatentable over

Curnow in view of Tackett, is respectfully requested. As set forth above, claims 4 and 11 have been canceled, thus obviating the rejection of these claims.

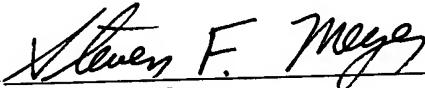
CONCLUSION

In light of the foregoing, Applicants respectfully submit that all claims, as currently presented, define patentable subject matter over the cited art, considered alone or in combination. Applicants respectfully request reconsideration and withdrawal of the rejections applied to the claims, and allowance of this application.

Respectfully submitted,
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Dated: December 29, 2004

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Amendments to the Drawings:

The attached sheets of drawings include changes to Figure 3 and newly submitted Figure 9. The sheet that includes Figures 3 and 4 replaces the original sheet including Figures 3 and 4. In Figure 3, marks have been added that indicate the cross-section at which Figure 9 is taken. Figure 9 is a newly added Drawing on a newly added sheet of drawings.

Attachments: Replacement sheet (Figs. 3 and 4)
New Drawing Sheet (Fig. 9)